

S/N: 10/034,323  
Reply to Office Action of October 18, 2006

Atty Dkt No. 2001-057-SFT (STK01057PUS)

### Remarks

Claims 28-40, as amended, are pending in this application. In an Office Action mailed October 18, 2006, the Examiner rejected claims 28-40 under 35 U.S.C. § 112, second paragraph. The Examiner also rejected claims 28-40 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,792,517 to Brunnett *et al.* (Brunnett) in view of U.S. Patent No. 6,058,372 to Sweet *et al.* (Sweet). Applicants disagree with the Examiner's rejections and respectfully request reconsideration in light of the following remarks.

Independent claim 28 provides a method of monitoring data stored on a primary storage system. A sequence of mirrors-in-the-middle is created. Each mirror-in-the-middle includes a copy of data stored on the primary storage system at a fixed point in time. A first mirror-in-the-middle is checked to see if a copy of data stored on the first mirror-in-the-middle satisfies at least one consistency constraint. If not, checking previous mirrors-in-the-middle in the sequence is repeated until one of the previous mirrors-in-the-middle includes an uncorrupted copy of data satisfying the consistency constraint.

Independent claim 35 provides a data management appliance including a random-access storage unit and control logic. The random-access storage unit stores a sequence of mirrors-in-the-middle with each mirror-in-the-middle including a copy of data stored on a primary storage system at a fixed point in time. The control logic checks a first mirror-in-the-middle to see if a copy of data stored on the first mirror-in-the-middle satisfies at least one consistency constraint and, if not, repeats checking previous mirrors-in-the-middle in the sequence until one includes an uncorrupted copy of data satisfying the at least one consistency constraint.

The Examiner rejected independent claims 28 and 35 as an obvious combination of Brunnett and Sweet. Brunnett fails to teach two aspects of Appellants' invention. First, Brunnett does not disclose checking previous mirrors-in-the-middle in the sequence. Second, Brunnett does not disclose checking a copy of data to see if it satisfies at least one constraint.

Brunnett's invention appears to be subdividing a hard disk so that one portion holds an imaged backup of another portion. As such, the Summary of the Invention makes no mention of any kind of checking. The cited section from column 3 also makes no mention of constraint checking:

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FIG. 2 is a block diagram of the control processes 50 of the disk which, in the illustrated embodiment, are embodied in the controller and in the disk's internal memory (comprising RAM 24 and ROM 26 in the illustrated embodiment).

In the illustrated block diagram, shown in FIG. 2, disk control processes 50 comprise ROM 26. A number of processing components are stored within ROM 26, some of which are illustrated in FIG. 2. Other processing components may be provided that are not specifically shown in FIG. 2. As shown in FIG. 2, within ROM 26, backup control software 52 and backup access control software 54 are each provided. In addition, ROM 26 has disk operating system software 58 and disk operational data 60. ROM 26 further comprises a password receipt and clearance mechanism 56.

Hardware switching mechanisms may be connected to backup access control software 54. In the illustrated embodiment, one or more jumpers 48a and switches 48b are coupled to backup access control software 54.

The cited section from column 5 and the following paragraph discloses only that data may be backed up at specific times.

The embodiment contemplates that the number of backup portions may be between one and two (more are possible), depending upon the available disk drive capacity and the desired security level. One copy could be for daily backups, while the second could be for weekly backups.

By way of example, consider the backup of one disk image in a backup portion 44, which is performed once a day. At the time of the daily schedule backup, the entire drive content, including operating system data, is mirrored to the firmware controlled backup portion. All data in the hard disk is now stored at the same LBA number plus an offset as in the original storage area in the primary portion 46. Accordingly, if data is retrieved from the backup portion, because the original data area was damaged, the firmware can either copy this disk image data back to the same LBA number plus offset location in the primary portion, or the firmware can use the same LBA offset for referring to the data in the backup portion for access to the user in using the host. The old original area can now be used for the firmware controlled disk mirroring.

This neither teaches nor even suggests either checking previous mirrors-in-the-middle in a sequence or checking a copy of the data itself to see if the data satisfies at least one constraint.

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Contrary to Applicants' invention, Brunnett discloses accessing back-up information without any constraint checks.

The disk may be provided with two alternate modes: in a first mode, the host, whenever it accesses data (reading or writing) in the hard disk, uses the primary portions of the disk media, and in a second mode, the host uses the backup portion of the disk media. When a given block is specified by the host for retrieval or for writing, if the hard disk is set to be in the first mode, that block of information is read from or written to a location within the primary portion. If the hard disk is in the second mode, that given block will be read from or written to a location within the backup portion. Alternatively, the backup area could always be accessible by the host, but in a read-only capacity.

Brunnett, col. 4, ln. 58-col. 5, ln. 2.

Brunnett neither teaches nor fairly suggests either checking previous mirrors-in-the-middle in the sequence or checking a copy of data to see if it satisfies at least one constraint, let alone repeatedly checking a sequence of previous mirrors-in-the-middle until one satisfies a constraint.

The Examiner admits Brunnett does not disclose repeatedly checking previous mirrors-in-the-middle until one satisfies a constraint.

Brunnett does not explicitly disclose if a copy of data stored in the first mirror does not satisfies at least one constraint, repeating checking previous mirror-in-the-middle (backup storage, firmware) until one of the checked previous mirror-in-the-middle include an uncorrupted copy of data satisfying the at least one constraint.

(Office Communication of October 18, 2006, pp. 4 and 6.)

To make up for the deficiencies in the disclosure of Brunnett, the Examiner argues that Sweet teaches Applicants' repeated checking of sequence of previous mirrors-in-the-middle. Sweet does not.

Sweet discloses a kiosk which is used to copy information from one computer hard drive to a new computer hard drive.

A stand-alone, interactive, self-service kiosk for initializing and copying computer hard drives and methods for the operation of the kiosk are disclosed. The kiosk, which

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includes a microprocessor, data storage and printer, is programmed to conduct a dialogue with a customer instructing them to connect their original and replacement hard drives to the kiosk. Once the hard drives are connected, the microprocessor automatically identifies the original and replacement hard drives, configures the replacement hard drive and copies all programs and data from the original hard drive to the replacement hard drive.

(Sweet, Abstract.)

Sweet has nothing whatsoever to do with mirrors-in-the-middle, let alone Applicants' repeated checking of previous mirrors-in-the-middle in a sequence of mirrors-in-the-middle until one of the mirrors-in-the-middle includes an uncorrupted copy of data satisfying the at least one consistency constraint.

The Examiner's entire support that Sweet discloses any aspect of Applicants' invention is on page 6 as follows:

Sweet teaches if a copy of data stored in the first mirror does not satisfies at least one constraint, repeating checking previous mirrors-in-the-middle (backup storage, firmware) until one of the checked previous mirror-in-the-middle include an uncorrupted copy of data satisfying the at least one constraint (Sweet Column 5 line 30 – column 6 line 52).

First, Sweet makes no mention of "firmware" or "backup storage" anywhere.

Second, the passage cited by the Examiner has nothing to do with repeatedly checking a sequence of mirrors-in-the-middle for any purpose whatsoever. The cited passage refers to a flow chart for copying data from one drive to another. (*See, Sweet, col. 5, ll. 29-36.*) Each file is read from the original hard drive (164) and scanned for a virus pattern (166). If a virus is found, a decision is made as to whether or not that the file is written onto the replacement hard drive (172).

At 172 the customer is shown the name of the file that is suspected of containing the computer virus and given the option of removing the file. If the customer chooses to remove the file, a "YES" output at 174 causes the operation to continue at 180. If the customer chooses not to remove the file, a "NO" output at 176 causes the operation to continue at 178.

(Sweet, col. 6, ll. 41-47.)

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Sweet discloses no sequence of mirrors-in-the-middle and no repeatedly checking any sequence of mirrors-in-the-middle for any purpose whatsoever.

Neither Brunnell nor Sweet, alone or in combination, teach or fairly suggest Applicants' repeatedly checking previous mirrors in the middle until one satisfies some constraint.

Claims 28 and 35 are patentable over Brunnell and Sweet. Claims 29-34 and 36-40 depend from claims 28 and 35 and are therefore also patentable over Brunnell and Sweet.

The Examiner also rejected claims 28-40 under 35 U.S.C. § 112, second paragraph, "as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention." In particular, the Examiner argues that the claims "recite 'constraint' but fail to point out what that constraint qualifies to or what are the conditions to satisfies that constraint." (Page 2.)

Applicants believe that the term "constraint" is well defined in the specification. Nevertheless, Applicants have amended the term "constraint" to include "consistency constraint." Support for this amendment appears at least on pages 34-35 of the specification.

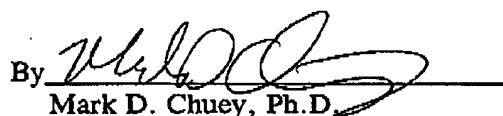
Claims 28-40 are pending in this application. Applicants believe claims 28-40 are in appropriate condition for allowance and respectfully request that this case be passed to issuance. No fee is believed due by filing this paper. However, any fee due may be charged to Deposit Account No. 19-4545.

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The Examiner is invited to contact the undersigned to discuss any aspect of this case.

Respectfully submitted,  
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